B.E.Fourth Semester (Civil Engineering) (C.B.S.) -

Structural Analysis - I

P. Pages : 3 **NKT/KS/17/7263**

Time : Three Hours * 0 4 9 7 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Assume suitable data whenever necessary.
9. Illustrate your answers whenever necessary with the help of neat sketches.
10. Use of non programmable calculator is permitted.

1. A continuous beam is loaded as shown in fig. 1 If support 'B' Sinks by 10mm, find the moments and reaction at support and Draw BMD by three moment theorem. **13**
Take E = $2x10^8$ kN/m^2 & I = $8.5x10^{-5}$ m^4

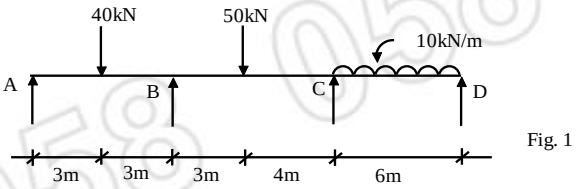

Fig. 1

OR

2. Analyse the continuous beam as shown in fig. 2 by using three moment equation and Draw BMD assume uniform EI. **13**

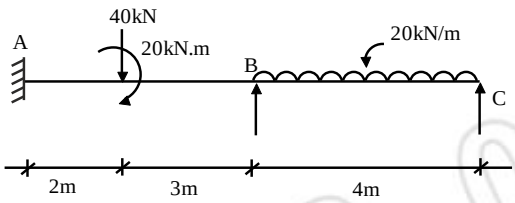

Fig. 2

3. Five rolling loads as shown in fig. 3. are crossing a simply supported beam of 15m span. **13**
Calculate
i) Max '+' ve and '–' ve SF at 5 m from left support
ii) Max BM. at 5m from left support
iii) Absolute Max^m BM anywhere in span.

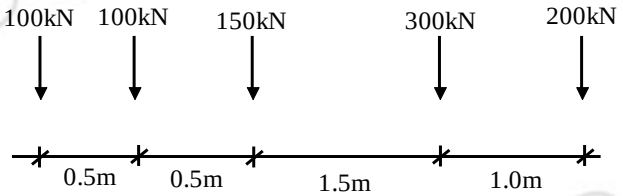

Fig. 3

OR

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4. For the deck type of truss as shown in fig. 4) Draw ILD for **13**

i) Force in member BC
ii) Force in member BD
iii) Force in member BE

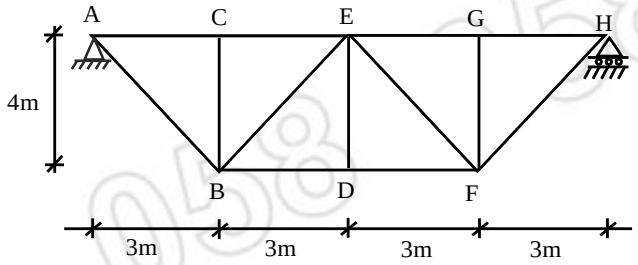

Fig. 4

5. Analyse the frame as shown in fig. 5. by strain energy method and draw BMD. **14**

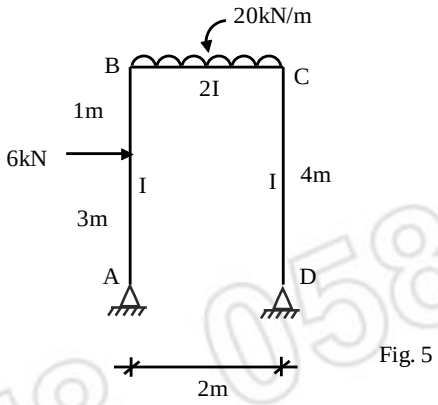

Fig. 5

OR

6. Using the strain energy method find forces in all the member of truss loaded as shown in fig. 6. The c/s area of all the members is same and they made up of same material. **14**

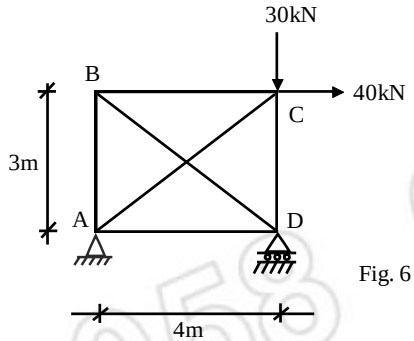

Fig. 6

7. a) Derive expression of Euler buckling load of column for both ends hinged. **7**

b) What are the limitation of Euler formula? Explain by taking example of steel column. **7**

OR

8. A two hinged parabolic arch of 16 m span and 3 m rise with $I = I_C \sec\theta$ (usual notation), if subjected to UDL of 10 kN/m over left half and 20 kN at the crown of arch. Calculate horizontal thrust and Draw BMD. Also calculate radial shear. **14**

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9. Analyse the portal frame by slope deflection method. Draw BMD ref. Fig. 7. **13**

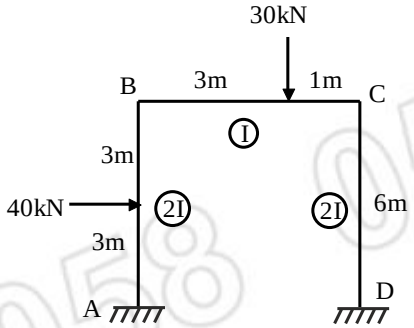

Fig. 7

OR

10. Analyse the frame as shown in fig. 8 by cantilever method. Area of each exterior column is one half of the area of interior column. **13**

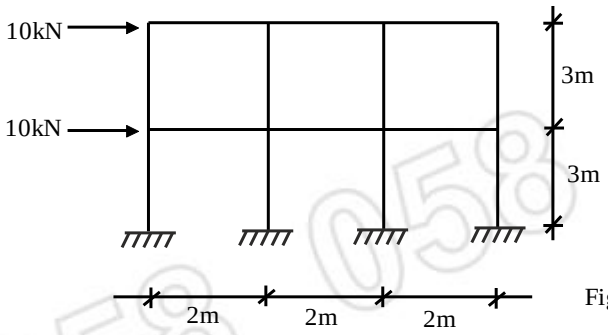

Fig. 8

11. Analyse the beam shown in fig 9 by flexibility method and draw BMD. **13**

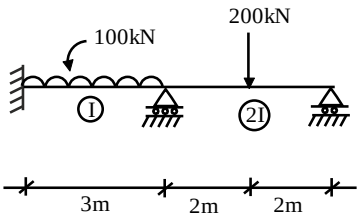

Fig. 9

OR

12. Analyse the fixed beam shown in fig. 10 by column analogy method. Draw BMD. **13**

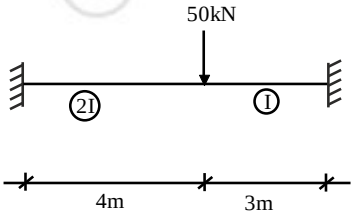

Fig. 10

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